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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/618,317

07/11/2003

Guolin Ma

10020800-1

4776

57299

7590

08/07/2007

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EXAMINER

HOLTON, STEVEN E

ART UNIT

PAPER NUMBER

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/618,317	Applicant(s) MA ET AL.	
	Examiner Steven E. Holton	Art Unit 2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 21 May 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-8, 12 and 13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 12 and 13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. This Office Action is made in response to applicant's amendment filed on 5/21/2007. Claims 1, 3-8, 12, and 13 are currently pending in the application. An action follows below:

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uemiya et al. (USPN: 4762381), hereinafter Uemiya in view of Butterworth et al. (USPN: 5847507), hereinafter Butterworth.

Regarding claim 1, Uemiya discloses an optical conduit with a body formed of optically transmissive material (Fig. 2a, element 12a) an input end (Fig. 2a, the end with LED 13a); an output end (Fig. 2a, the end opposite of element 13a); a curved surface that totally and internally reflects light from the input end towards the output end (Fig. 2a and Fig. 2f, the inside of the light pipe is circular and curved for directing light towards the end of the waveguide); a light source embedded within the input end of the body, such that light is channeled from the input end through the body and emitted out the output end (Fig. 2a, element 13a)". However, Uemiya does not expressly disclose a

reflector cup embedded within the input end of the body and partially surrounding the light source and having an opening facing the output end of the body.

Butterworth discloses a light emitting diode element with a light source (Fig. 2, element 110) surrounded by a reflector cup (Fig. 2, element 120).

At the time of invention it would have been obvious to one skilled in the art to combine the teachings of Uemiya and Butterworth to produce a waveguide with an embedded light source and reflector cup. By embedding a light emitting diode described by Butterworth into a light guide as shown by Uemiya would align the light source to face towards the output end of the waveguide and similarly position the reflector cup of Butterworth to partially surround the light source and have an opening facing the output end of the waveguide. The motivation would have been to use an efficient light emitting diode as the light source for the waveguide assembly (Butterworth, col. 2, lines 1-3). Thus, it would have been obvious to combine waveguide with embedded light source of Uemiya with an light emitting diode with a reflector cup of Butterworth to produce the device as described in claim 1.

Regarding claim 3, Uemiya discloses the surfaces of the waveguides to be half circles (Figs 6c and 9a). The Examiner notes that half circles are parabolic in shape and the waveguide is therefore a paraboloid.

Regarding claim 4, Uemiya discloses waveguides with different sections with different curve equations (Fig. 12b, elements 113 and 112; col. 9, lines 53-62).

Regarding claim 5, Uemiya discloses using a light emitting diode as the light source (col. 4, lines 4-13).

Regarding claim 6, Uemiya discloses the waveguide as being flexible (col. 4, lines 38-45). The Examiner notes that with a flexible waveguide providing a gradual bend within the waveguide would be a matter of design choice for one skilled in the art. The final path and layout of the optical waveguide would be chosen based on the area the waveguide is placed and the allowable space and shape the waveguide could be formed within. The flexible waveguide could allow for bends of any angle to direct light from the input to the output as needed. The Examiner also notes that if there is a bend in the waveguide the reflector cup does not necessarily have it's opening facing the output end as described in claim 1.

Regarding claim 7, Uemiya uses a polymer material to form the waveguide (col. 2, lines 54-55). The Examiner notes that plastics are polymers and that it is well known in the art that optical waveguides can be formed of acrylics, polycarbonates and plastic materials.

3. Claims 8, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Son (USPN: 6741234) in view of Uemiya and Butterworth.

Regarding claims 8 and 13, the Examiner notes that these claims are similar to claim 1 and provide further elements around the optical waveguide with an embedded light source and reflector cup.

Son discloses an optical mouse including a housing (Fig. 7, the mouse body) and an image sensor for receiving an image of a surface (Fig. 8, element 'sensor) and a lens to focus reflected light onto the image sensor (Fig. 8, element 'light-receiving lens').

However, Son does not disclose an optical conduit with an embedded light source and reflector cup for directing light from the input to the output of the optical conduit.

As discussed above in claim 1, the combination of Uemiya and Butterworth disclose an optical conduit with an embedded light source and reflector cup as described in claims 8 and 13.

At the time of invention it would have been obvious to one skilled in the art that the light source and light emitting lens arrangement of Son could be replaced with the flexible optical waveguide with embedded light and reflector cup described by Uemiya and Butterworth. The selection of one type of optical waveguide system for another would be a matter of design choice for one skilled in the art by replacing one type of light directing system with an equivalent light directing system. Thus, it would have been obvious to one skilled in the art to combine the teachings of Son with Uemiya and Butterworth to produce an optical mouse with a waveguide having an embedded light source and reflector cup as described in claims 8 and 13.

Regarding claim 12, Uemiya discloses the surfaces of the waveguides to be half circles (Figs 6c and 9a). The Examiner notes that half circles are parabolic in shape and the waveguide is therefore a paraboloid.

***Response to Arguments***

4. Applicant's arguments with respect to claims 1-8, 12 and 13 have been considered but are moot in view of the new ground(s) of rejection based on newly found prior art.

***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

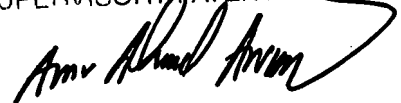
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven E. Holton whose telephone number is (571) 272-7903. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Steven E. Holton  
Division 2629  
August 3, 2007

AMR A. AWAD  
SUPERVISORY PATENT EXAMINER

A handwritten signature in black ink, appearing to read 'Amr A. Awad', is written over the printed name and title.